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A NEW GOPHER SNAKE (PITUOPHIS) FROM SANTA CRUZ ISLAND, CALIFORNIA

BY

LAURENCE M. KLAUBER

Curator of Reptiles and Amphibians, San Diego Society of Natural History

Museum of Comparative Zoology
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In a recent study of the gopher snakes of the genus *Pituophis* in Baja California,[*] it was found that three island populations differed sufficiently from those of the mainland to warrant recognition as new subspecies. This naturally led to an investigation of the snakes found on the islands off the coast of the State of California, *Pituophis* being definitely known to occur on two, Santa Cruz and Santa Catalina, and rumored on a third, San Clemente. I have been unable to find any important differences between the Santa Catalina specimens and *Pituophis catenifer annectens* of the nearby mainland; but the Santa Cruz Island snakes, while overlapping, in some degree, both *P. catenifer catenifer* and *P. c. annectens*, possess average differences which warrant nomenclatorial segregation.

Pituophis catenifer pumilus subsp. nov.

SANTA CRUZ ISLAND GOPHER SNAKE

Plate 3, fig. 1.

1914. *Pituophis catenifer* Van Denburgh and Slevin, Proc. Cal. Acad. Sci., ser. 4, vol. 4, no. 5, p. 136.

1919. *Pituophis catenifer catenifer* (part) Van Denburgh and Slevin, Proc. Cal. Acad. Sci., ser. 4, vol. 9, no. 6, p. 211.

Type.—No. 17238 in the collection of the San Diego Society of Natural History. Collected on Santa Cruz Island, Santa Barbara County, California, by Norman Bilderback, May 5, 1938.

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[*] The Gopher Snakes of Baja California, with Descriptions of New Subspecies of *Pituophis catenifer*. Trans. San Diego Soc. Nat. Hist., Vol. 11, No. 1, pp. 1-40, 1946.

Diagnosis.—A subspecies most closely resembling *P. c. catenifer* and *P. c. annectens* of the mainland, and differing in tail length and pattern from all other mainland species and subspecies of the genus, as do these two. It most nearly resembles *annectens* in pattern, including color and blotch counts, but is nearer *catenifer* in the number of ventral and subcaudal scales. It differs from both in having fewer scale rows—although with some overlapping—and in being stunted in size. In comparison with other island forms, *pumilus* has more blotches and a proportionately longer tail than *insulanus*, lacks the parallel darks subcaudal stripes and extensive dark head blotches of *fuliginatus*, and is without the subocular scales of *coronalis*.

Description of the Type.—A male, probably a young adult. Length over-all 646 mm.; length of tail 111 mm.; ratio of tail to length over-all .172. The body is relatively slim for *Pituophis*. The head is moderately distinct from the neck, and is wedge-shaped, with a rounded snout. The scale rows are 25–29–19. There are 29 scales only at one or two places forward of mid-body, where there are short runs of extra scales; elsewhere 27 rows are the maximum. The dorsal rows are conspicuously keeled, and are smaller than the lateral. About 8 of the lowest rows on either side are smooth. The lateral row next to the ventrals is considerably larger than those above.

There are 217 ventrals, and 72 subcaudals, most of which are paired, although the third to fifth after the anal are undivided.

The rostral is the same in height and width, and is not conspicuously raised above the contiguous scales. It is recurved over the top of the snout and almost completely separates the internasals. The internasals are triangular and posteriorly divergent. There are four prefrontals, the inner long and triangular, the outer curved over the canthus to contact the loreals. The frontal is quadrangular and is widest in front; it indents the parietals for less than ¼ of their length. The supraoculars are narrow in front and do not touch the prefrontals. The parietals are relatively short and even-edged; they are not conspicuously indented by the uppermost temporals, as in many western *Pituophis*.

The nasals are subequal, with large nares at the upper end of the suture which separates them. There is a small oval loreal on either side, with a tiny subloreal on the left. The eye is large. The preoculars are 2–2, the upper much the larger; the postoculars are 3–3 and are subequal. The temporals are 3+3, 3+3; they are more regular than in many *Pituophis*. The lowest in the first row on the right is very small.

The supralabials are 8–8; the seventh is the largest but does not greatly exceed the sixth; the fourth touches the eye. The infralabials are 12–12, the first pair meeting on the median line; the seventh is the largest, with the sixth next in order of size. The mental is small and triangular. The anterior genials are long and narrow; they are medianly in contact; the posterior are still slimmer and are separated by 2 to 4 rows of gulars.

The head is light-brown. The posterior edges of the prefrontals are slightly darkened, and the parietals are spotted with black. On the sides the usual *Pituophis* postocular stripe is irregularly in evidence. There is a heavy black mark under each eye in the suture between the fourth and fifth supralabials, and the two sutures anterior to these are marked with thin black lines. A few of the infralabial sutures are also lined with black, otherwise the ventral surface of the head is unmarked cream-color.

There is a series of 78 median blotches on the body, and 25 spots on the tail. Anteriorly there are four alternating secondary series on either side. The main series is highly irregular and somewhat indefinite, for although many of the included scales are black, particularly in front, others are centrally streaked with brown or gray, and the light scales in the interspaces are punctated with darker. Thus there is a general effect of mottling which interrupts the regularity of the pattern. The first lateral series on either side is more or less confluent with the dorsal blotches anteriorly. The interspaces, where evident, are buff; but the sides are much suffused with gray or brown, upon which the black secondary series of spots are scattered. There are black blotches on the outer edges of the ventrals, with another paired series of brown spots midventrally. The ground color of the under surface is buff. Posteriorly the main dorsal series is more solidly black, with the interspaces clearer, so that they are also more definite. On the whole the snake gives the impression of being grayer than *annectens,* especially on the sides, where there is sufficient gray to suggest longitudinal stripes.

Paratypes.—Eight paratypes are available: CAS 36120-1, 45131; Stanford 8389; MCZ 12679; and MVZ 11131-3. The last three are from Johnson's or Johnson's Landing, near Gull Rock; the localities of the others are given merely as Santa Cruz Island.

The scale rows vary from 23–27–19 to 27–29–21. Together with the type, whose counts are included in the following statistics, 2 specimens have 27 rows at mid-body, one has 28, and 6 have 29. This is a lower average than in any other subspecies.

The ventrals vary from 209 to 226 in the males (7 counts), mean 215.0; in the females from 212 to 221 (2 counts), mean 216.5. The subcaudals in the males range from 69 to 73 with a mean of 70.9; and in the females from 55 to 61, mean 58.0. These averages are somewhat below those of mainland *P. c. catenifer.* Several specimens have a block of 3 to 5 undivided subcaudals beginning 2 or 3 scales back of the anal plate, but this is not universal.

The snout is blunt compared to mainland *Pituophis.* The supralabials are usually 8 but may be 9 or rarely 10. Only one supralabial touches the eye; this is the fourth where the total is 8, or the fifth if there are 9 or 10. The infralabials are generally 12 but range from 10 to 13. The loreals are usually single but there is a small subloreal in 3 counts out of 18. The preoculars are single in 9 counts out of 18, and paired in the others; the second preocular, if present, is always small and is the lower of the two. The postoculars number 3 in 12 out of 18 counts, 4 in the others. They are subequal in size. The temporals vary from 2+3 to 3+4 or 4+3. They average fewer and are more regular than in the mainland snakes. There are 4 prefrontals in all specimens. They are not laterally divided or irregular in any other way, nor has any specimen an azygos. The supraoculars touch the prefrontals in some specimens but not in others. The parietals are regular and are triangular in shape.

The ratio of the tail length to length over-all averages about .173 in the males and .156 in the females. The longest specimen, a male, measures 788 mm.; the shortest 228 mm.

The body blotches vary from 58 to 85 (mean 75.6), and the tail spots from 17 to 26 (mean 22.2).

The pattern comprises a series of dorsal spots or blotches which are usually black from head to tail, although they may be brownish, or the scales comprising them may have brown centers, at mid-body. Anteriorly the blotches are generally longer than wide, being about 5 scale rows wide and 3 scales (end to end) long. They are quite irregular, and often confluent with each other, or with the first subsidiary series on either side, especially on the neck. Posteriorly they are round or oval, and are better separated and more distinct. There are generally 4 or 5 lateral series of blotches, the lowest of which marks the outer edges of the ventrals. The tail also is somewhat spotted below; in some specimens there are a few triangular spots in parallel rows.

The ground color is brown, or gray, middorsally and laterally, with a gray streak between, which is rather characteristic of this subspecies. The ventrum has a cream or buff ground color.

On the head a brown transverse bar between the prefrontals and supraoculars is sometimes present, but in other specimens is obsolete; the same may be said of a postocular dark streak which seems to be lost with age. There are generally a few black or brown spots on the frontal and parietals. There is always a vertical dark bar, or triangle, in the supralabial suture below the eye; and other labial sutures are often touched with dark. The head has a brown ground color above, and cream or buff below.

Range.—*Pumilus* is found only on Santa Cruz Island, one of the Santa Barbara group, off the coast of California.

Remarks.—*Pumilus* most nearly resembles the mainland snakes in the vicinity of Santa Barbara, which are *annectens*, with tendencies toward *catenifer.* From these it does not differ greatly in pattern, although slightly more streaked anteriorly, and often (but not always) with narrower anterior dorsal blotches. With respect to scutellation, in comparison with these mainland snakes *pumilus* has fewer ventrals and subcaudals on the average, and more often has single preoculars.

Pumilus more frequently has 2 temporals in the first row than is the case in the mainland specimens. While the difference is significant, there is overlapping. The temporals do not usually constitute a satisfactory character for identification in *Pituophis* because of the irregularity of their arrangement.

The most consistent difference from the mainland *Pituophis* is in scale rows. Snakes with only 29 rows are rather unusual on the mainland of California, while on Santa Cruz Island all available specimens have 29 or less.

Comparing our nine specimens of *pumilus* with a series of eight *annectens,* kindly sent me from Santa Barbara by Mr. Waldo G. Abbott, we have the following comparative distribution:

Scale Rows	*Santa Cruz Island*	*Santa Barbara*
27	2	
28	1	
29	6	
30		
31		3
32		2
33		2
34		1
	9	8

Or we may make the following comparison with all available scale-row data on *catenifer catenifer* and *c. annectens* from the mainland:

Scale Rows	*P. c. pumilus*	*P. c. catenifer*	*P. c. annectens*
27	2		
28	1		
29	6	20	9
30		3	10
31		172	139
32		7	40
33		128	242
34		3	25
35		18	59
36			3
37		1	5
38			1
	9	352	533

It will be observed that only about 5.7 per cent of *catenifer catenifer* and 1.7 per cent of *c. annectens* have 29 scale rows, whereas all *c. pumilus* have 29 or less. Although 9 is a relatively small sample from which to estimate the actual population composition of *pumilus*, there is no doubt as to the significance of this difference. Twenty-nine scale rows occur most frequently in *catenifer catenifer* in snakes from the Sacramento Valley. Specimens of *deserticola* with 29 scale rows are quite prevalent in some areas, but this subspecies differs from *pumilus* in other characters of lepidosis, pattern, and proportionate tail length.

Another important difference in *pumilus* is its size. We have reason to believe it to be a stunted form, although this is difficult to prove. The dispersion curve of sizes in a population of snakes does not lend itself to mathematical analysis, so we are unable to make estimates of the degree to which size limits will be increased as more specimens become available, although we know there will be such an increase. We have the following evidence concerning the relative sizes of *pumilus* and other subspecies:

1. Comparisons with other island forms, of which relatively small samples are available:

Subspecies	*Number of Specimens*	*Size Range mm.*
P. c. pumilus	9	228 – 788
P. c. insulanus	7	460 – 1213
P. c. fuliginatus	15	327 – 1390
P. c. coronalis	4	353 – 1150
P. c. annectens (Santa Catalina)	3	489 – 1051

2. A similar comparison may be made with the Abbott series of mainland snakes from Santa Barbara:

Locality	*Number of Specimens*	*Size Range mm.*
Santa Cruz Island	9	228 – 788
Santa Barbara	8	361 – 1478

3. Out of over 300 *catenifer catenifer* the shortest normal specimen is 310 mm. There is one specimen, MVZ 2314, which is only 202 mm., but this is clearly abnormal. It has a peculiar navel which divides some ten of the adjacent ventrals, although it was found on a lawn, and therefore it is not an unhatched embryo. One may doubt whether it would have survived. The shortest *pumilus* (228 mm.) is not a freak . It was collected in April, and therefore must have been more than six months old. The next to the shortest specimen, CAS 36121, also collected in April (but by a different collector, in a different year) measures 272 mm., considerably smaller than any *catenifer catenifer*.

4. The smallest *annectens*, out of some 416 specimens collected in the wild, measures 350 mm.; the next smallest 359. Out of 73 young *annectens* hatched by Mr. C. B. Perkins at the San Diego Zoo, the two shortest measured 322 mm. each. This was in a brood of 10, all notable for their small size (range 322 to 346 mm., mean 333); the smallest in any other brood measured 355 mm.

Summing up, I think the evidence rather strong that *pumilus* is a stunted subspecies, distinctly smaller than the mainland subspecies *catenifer* and *annectens*. Neither of the latter, by the way, is particularly large among *Pituophis*; they are considerably exceeded in size by *affinis*, *bimaris*, and *sayi*.

The only contrary evidence is a comment by Mr. E. Z. Rett, of the Santa Barbara Museum of Natural History, to the effect that he saw only one snake on the island in many visits. This was a gopher snake which he tried to capture but failed. It appeared to him to be 4 or 5 feet in length.

In view of the overlapping in scale rows, I consider only a subspecific designation warranted, even though actual intergradation is not possible.

One *pumilus* contained the remains of a small mammal.

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Summary.—*Pituophis catenifer pumilus* is described as a new subspecies from Santa Cruz Island off the coast of southern California. It differs from its nearest relatives of the mainland, *P. c. catenifer* and *P. c. annectens,* in having fewer scale rows, on the average, and in probably being a stunted form.

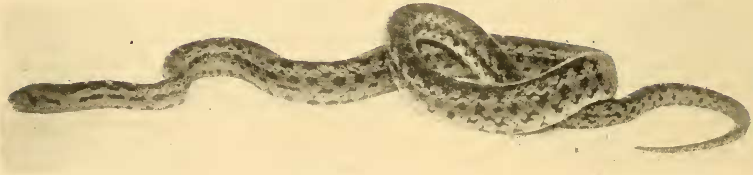

Fig. 1. *Pituophis catenifer pumilus*

Santa Cruz Island, California. Photograph by J. R. Slevin, California Academy of Sciences.